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(71) Applicant: **LAB VISION CORPORATION** [US/US];
47790 Westinghouse Drive, Fremont, CA 94539 (US).

(72) Inventors: **TSEUNG, Ken, K.**; 4018 Allyson Terrace,
Fremont, CA 94538 (US). **RHETT, Norman, K.**; 544

Santander, San Ramon, CA 94583 (US). **TAKAYAMA, Glenn, K.**; 240 Heather Place, Danville, CA 94526 (US).
WONG, Wai, Bun; 3669 Dowitcher Terrace, Fremont,
CA 94555 (US). **YUEN, Della, P.**; 1052 West Hill Court,
Cupertino, CA 95014 (US).

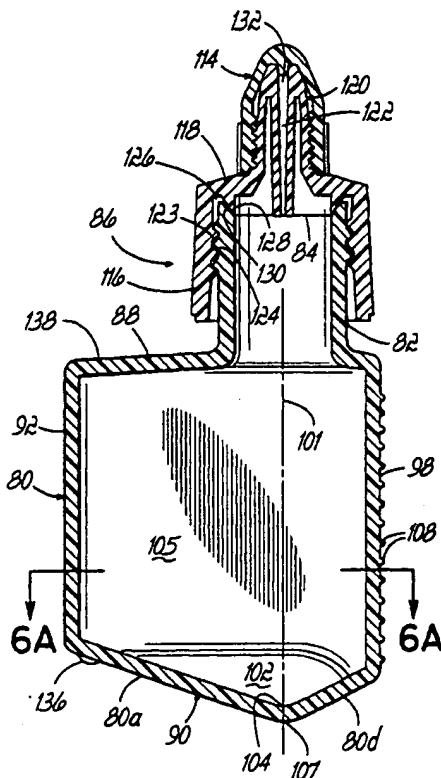
(74) Agents: **FREL, Donald, F.** et al.; Wood, Herron & Evans,
L.L.P., 2700 Carew Tower, Cincinnati, OH 45202 (US).

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(54) Title: **AUTOMATED TISSUE STAINING SYSTEM AND REAGENT CONTAINER**



(57) Abstract: An automated staining system (10) and a reagent container (50) designed for use with the automated staining apparatus (10). The reagent container (50) includes a reagent containment section (80) capable of containing a volume of a reagent. The reagent containment section (80) includes an upper wall (88) and a base wall (90) that are spaced apart along an axis. The base wall (90) includes a well (102) having a nadir (104) that is aligned axially with an access opening in the upper wall (88) so that a reagent probe (38) entering the opening parallel to said axis will travel toward the nadir (104). In another aspect of the invention, the reagent container (50) may include a two-dimensional data element (140) containing reagent information. The staining apparatus (10) may include one removable drawer for holding reagent containers (50) and another removable drawer holding slides (12).

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Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK,
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 670 117 A (ERB HERMANN ET AL) 23 September 1997 (1997-09-23)	1-7
Y	column 1, line 39 - line 43 column 1, line 62 - line 67 column 3, line 2 - line 10; figures 2A,3 ---	8-14
Y	US 5 839 091 A (CORL MARK V ET AL) 17 November 1998 (1998-11-17) cited in the application column 3, line 48 - line 49; figure 1B column 12, line 54 - column 13, line 57; figure 24 ---	8-14
A	GB 2 216 259 A (MICROVOL LTD) 4 October 1989 (1989-10-04) page 5, paragraph 2 - paragraph 3 --- -/--	4-6, 11-13

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

* & * document member of the same patent family

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Hocquet, A

INTERNATIONAL SEARCH REPORT

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PCT/US 02/37552

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 264 182 A (SAKAGAMI TOSHIO) 23 November 1993 (1993-11-23) column 5, line 22 - line 29; figure 2 ---	1,2
X	DE 94 00 010 U (POHL HJALTE ;HABER HORST DIPL ING FH (DE); SCHNEIDER JUERGEN (DE)) 24 February 1994 (1994-02-24) figure 1 ---	1,2
A	US 5 523 047 A (CORBY KENNETH D ET AL) 4 June 1996 (1996-06-04) figures 1-3 ---	1,7
A	EP 0 987 181 A (IVOCLAR AG) 22 March 2000 (2000-03-22) paragraph '0002! paragraph '0026! ---	1-7
A	US 5 417 121 A (HVIDTFELDT KRISTIAN J ET AL) 23 May 1995 (1995-05-23) column 9, line 15 - line 28; figure 3 ---	1,2
A	US 5 654 200 A (COPELAND KEITH G ET AL) 5 August 1997 (1997-08-05) column 9, line 47 - line 54; figure 14 column 12, line 27 - line 38; figure 15 ---	8
Y	WO 01 51909 A (LAB VISION CORP) 19 July 2001 (2001-07-19) cited in the application	15-19, 26-28
Y		29-33
X	page 12, line 8 - line 20 page 14, line 20 - line 21; claims 11-16 page 9, line 5 - line 7 page 12, line 1 - line 7 ---	34-37
Y	US 5 854 075 A (LEVINE MARSHALL S ET AL) 29 December 1998 (1998-12-29) column 9, line 66 -column 10, line 5 ---	15-19, 26-28
Y	US 5 793 969 A (KAMENSKY LOUIS A ET AL) 11 August 1998 (1998-08-11) column 6, line 16 - line 27 ---	29-33
A	US 5 573 727 A (KEEFE RAYMOND A) 12 November 1996 (1996-11-12) column 2, line 30 - line 53; figure 1 ---	20
A	US 5 482 839 A (MINAKAWA HIDETAKA ET AL) 9 January 1996 (1996-01-09) column 6, line 6 - line 11 column 6, line 37 - line 47 column 3, line 60 -column 4, line 14; figures 1-5 ---	20-25
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INTERNATIONAL SEARCH REPORT

National Application No
PCT/US 02/37552

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 912 456 A (YOUNG ROBERT R) 14 October 1975 (1975-10-14) column 3, line 43 - line 45; figure 1 column 7, line 3 - line 8; figure 3	21
A	WO 00 63696 A (QUEST DIAGNOSTICS INVEST INC) 26 October 2000 (2000-10-26) page 4, line 21 -page 5, line 11; claims 2,3 page 8, line 3 - line 14; figure 4 page 13, line 8 - line 12	38,42-45
A	EP 0 510 686 A (HITACHI LTD) 28 October 1992 (1992-10-28) column 9, line 56 - line 58; figure 4	15

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-14

Reagent container and staining apparatus comprising a plurality of said reagent containers

2. Claims: 15-19, 26-28, 38-44

Staining apparatus with reagent containers carrying two-dimensional data storage elements and a robotic delivery system including a probe and an optical reader; method of staining including the reading of said two-dimensional data storage elements.

3. Claims: 20-25

staining apparatus with a drawer

4. Claims: 29-37

methods of operating a staining apparatus with a remote computer system

5. Claims: 45-53

staining method using a slide holding a tissue specimen and a two-dimensional data element and using an optical reader to decode the data element and to image the tissue specimen

INTERNATIONAL SEARCH REPORT

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/37552

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5670117	A	23-09-1997	DE 9411517 U1 AT 205748 T DE 59509606 D1 EP 0694334 A1 JP 2651369 B2 JP 8058828 A	17-08-1995 15-10-2001 25-10-2001 31-01-1996 10-09-1997 05-03-1996
US 5839091	A	17-11-1998	US 2002116132 A1 US 6349264 B1	22-08-2002 19-02-2002
GB 2216259	A	04-10-1989	NONE	
US 5264182	A	23-11-1993	JP 2269971 A JP 2269972 A DE 4011584 A1 US 5213761 A	05-11-1990 05-11-1990 18-10-1990 25-05-1993
DE 9400010	U	24-02-1994	DE 9400010 U1	24-02-1994
US 5523047	A	04-06-1996	US 5360133 A DE 19500043 A1 GB 2285616 A ,B	01-11-1994 20-07-1995 19-07-1995
EP 0987181	A	22-03-2000	DE 19842464 A1 EP 0987181 A2 JP 2000085737 A	23-03-2000 22-03-2000 28-03-2000
US 5417121	A	23-05-1995	AT 132270 T AT 209361 T DE 69024494 D1 DE 69033868 D1 DE 69033868 T2 WO 9100520 A1 DK 678746 T3 EP 0478683 A1 EP 0678746 A1 JP 2708275 B2 US 5309775 A	15-01-1996 15-12-2001 08-02-1996 03-01-2002 27-06-2002 10-01-1991 21-05-2002 08-04-1992 25-10-1995 04-02-1998 10-05-1994
US 5654200	A	05-08-1997	US 5595707 A US 2002072122 A1 US 2002114733 A1 US 6352861 B1 US 2002001849 A1 US 2003022391 A1 US 6472217 B1 US 5650327 A US 5654199 A CA 2077452 A1 DE 69117052 D1 DE 69117052 T2 DK 517835 T3 EP 0517835 A1 ES 2085471 T3 JP 5504627 T JP 3186764 B2 WO 9113335 A1	21-01-1997 13-06-2002 22-08-2002 05-03-2002 03-01-2002 30-01-2003 29-10-2002 22-07-1997 05-08-1997 03-09-1991 21-03-1996 14-11-1996 10-06-1996 16-12-1992 01-06-1996 15-07-1993 11-07-2001 05-09-1991

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/37552

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0151909	A	19-07-2001	AU 2634501 A CA 2396805 A1 CN 1404573 T EP 1247084 A1 JP 2003519791 T WO 0151909 A1	24-07-2001 19-07-2001 19-03-2003 09-10-2002 24-06-2003 19-07-2001
US 5854075	A	29-12-1998	US 5676910 A AU 5927996 A CA 2220049 A1 EP 0834065 A1 JP 11506826 T WO 9641148 A1	14-10-1997 30-12-1996 19-12-1996 08-04-1998 15-06-1999 19-12-1996
US 5793969	A	11-08-1998	US 5587833 A AU 1702397 A WO 9725678 A1 CA 2166464 A1 EP 0707715 A1 IL 110257 A JP 9503868 T WO 9502204 A1 WO 9748999 A1 US 5602674 A US 5790308 A	24-12-1996 01-08-1997 17-07-1997 19-01-1995 24-04-1996 28-09-2000 15-04-1997 19-01-1995 24-12-1997 11-02-1997 04-08-1998
US 5573727	A	12-11-1996	AU 671276 B2 AU 4051493 A WO 9323732 A1 EP 0640209 A1 JP 8500434 T	22-08-1996 13-12-1993 25-11-1993 01-03-1995 16-01-1996
US 5482839	A	09-01-1996	US 5290708 A AU 660814 B2 AU 4169793 A AU 640762 B2 AU 7397791 A CA 2039322 A1 DE 69130303 D1 DE 69130303 T2 EP 0449321 A2 ES 2124691 T3 JP 3010509 B2 JP 4218775 A KR 9514745 B1 US 5158895 A JP 2946831 B2 JP 4230859 A JP 5040122 A	01-03-1994 06-07-1995 14-10-1993 02-09-1993 03-10-1991 01-10-1991 12-11-1998 20-05-1999 02-10-1991 16-02-1999 21-02-2000 10-08-1992 14-12-1995 27-10-1992 06-09-1999 19-08-1992 19-02-1993
US 3912456	A	14-10-1975	NONE	
WO 0063696	A	26-10-2000	AU 4485800 A EP 1212617 A1 WO 0063696 A1	02-11-2000 12-06-2002 26-10-2000
EP 0510686	A	28-10-1992	JP 2692413 B2 JP 4326063 A	17-12-1997 16-11-1992

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/37552

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0510686	A	DE 69220714 D1	14-08-1997
		DE 69220714 T2	06-11-1997
		EP 0510686 A2	28-10-1992
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